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A Note on the Occurrence of Tick-borne Fever in Cattle in Scotland with Comparative Studies of Bovine and Ovine Strains of the Organism

BY

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SUMMARY.—Tick-borne fever was diagnosed in a dairy cow in a Dumfriesshire farm. The geographical distribution suggests that the disease in cattle is caused by an ox-adapted strain of the organism. Infectivity and cross-immunity experiments are described which show that there are considerable differences between ovine and bovine strains.

CASES of pyrexia of unknown origin have been encountered in milking cows on a dairy farm near Dumfries for a number of years.

On October 5th, 1959, a cow which had calved 3 weeks earlier presented the following symptoms: temperature 107·1° F., pulse rate 90 per minute, respiratory rate 25 per minute. The coat was staring and there was a drop in milk yield from over 5 gallons to less than 1 gallon. Examination of blood smears showed the presence of typical tick-borne fever inclusion bodies in 50 per cent. of the circulating polymorphs. The infection was transmitted to sheep as described below.

The Occurrence of the Disease on the Farm

The disease usually affects milking cows following spring or autumn calving, which coincides with spring and autumn periods of tick activity. Most of the cases have been bought-in animals; the home reared stock appears to be immune. Some animals have had 2 attacks in successive tick seasons.

The farmer's attention is first drawn to affected cows by the abrupt fall in milk production. This being so, non-lactating cows may easily be affected and have a high temperature for several days without the owner's knowledge. Although temperatures of 107° to 108° F. are common for a day or two when the disease develops, the pyrexia usually disappears within a week but milk yield is frequently diminished for the rest of the lactation. One animal died on the 2nd day of fever and at *post-mortem* examination showed the presence of multiple petechial haemorrhages suggestive of haemorrhagic septicaemia. Unfortunately, a bacteriological examination was not carried out. All the other cases have recovered but an occasional animal showed respiratory symptoms for some weeks after the attack of fever, possibly the result of secondary infection.

The first cows with pyrexia on the farm were treated with crystalline sodium penicillin G, 5 mega units intramuscularly repeated after 12 hours. However, the response was poor and oxytetracycline* was tried with better results. Doses of 900 mg. intramuscularly, repeated in about 12 hours, caused the temperature to drop to normal within 24 hours with a quick return to normal milk production.

The holding has been run as a dairy farm for many years. Although all potentially arable some of the fields have not been ploughed for 13 years and there is a plentiful supply of rough herbage which would provide good tick cover.

The only contact with sheep has been the occassional introduction, for a few weeks in late summer, of flocks of lambs to eat the excess grass.

The farm marches with a roe-deer conservancy and it was thought possible that the deer, which graze on the fields in winter, might be reservoirs of the infection. With the co-operation of the game-

* Terramycin.

warden, samples of citrated blood from 3 roe-deer shot during the winter were examined microscopically and by inoculation into sheep and goats but no evidence of tick-borne fever infection was found.

Experimental Transmission to Sheep

METHODS

The animals used in the experiments were sheep reared at Moredun Institute. Blood samples were taken into 3 per cent. potassium citrate in normal saline in the proportion of 1 part citrate solution to 4 parts blood. Transmissions were made by the intravenous inoculation of 2 ml. of citrated blood. Temperatures were recorded daily and blood smears were examined when body temperatures exceeded 104° F. One hundred polymorphs (neutrophils and eosinophils) were examined and the number containing inclusion bodies was recorded.

RESULTS

Blood from the affected cow was inoculated into 2 sheep and thereafter the infection was passaged in series in sheep.

severe and comparable with the reactions produced by the mouse-adapted strain in sheep not previously infected. The 2 sheep (6007 and 6319) in which definite infection had been established with the bovine strain were reinfected with a virulent sheep strain and both reacted severely. Thus there was no evidence of immunity to ovine strains of the virus following infection with the bovine strain.

In addition to the experiments described above 3 blood samples from cows affected with tick-borne fever on a farm in Devonshire have been examined for their infectivity for sheep. The first sample from a 5-year-old Friesian cow with a temperature of 104° F. failed to show inclusion bodies on microscopical examination. The blood was inoculated into a Galloway heifer and 2 sheep (Nos. 3819 and 3821) but none of these animals developed a temperature reaction and no inclusions were seen in blood smears. As is described below all 3 animals reacted positively when reinoculated with another sample of bovine blood.

The second sample from a 3-year-old Friesian cow with a temperature of 105·1° F. had clotted in

TABLE I
PASSAGE IN SHEEP OF BOVINE STRAIN OF TICK-BORNE FEVER FROM DUMFRIESSHIRE

Sheep number	Date of primary infection	Inoculum (2 ml. citrated blood)	Maximum percentage of infected polymorphs	Maximum temperature °F.	Duration of reaction in days after inoculation	Date of reinfection with sheep strain	Maximum percentage of infected polymorphs	Maximum temperature °F.	Duration of reaction in days after inoculation
6006	7.10.59	Cow	1%	105·0	7—8	* 2.11.59	38%	105·6	7—9
6082			0	104·8	6—7	*12.11.59	42%	106·0	7—8
6058	20.10.59	Sheep 6006 6082	1%	104·6	8	*15.11.59	50%	105·3	5—9
6007	29.10.59	6058	11%	104·9	4—6	†16.3.60	90%	107·5	3—10
6319	9.11.59	6007	36%	104·8	5—11	†16.3.60	92%	107·4	3—16
6318	24.11.59	6319	0	104·4	6—9	*10.12.59	34%	107·0	5—6
6379	9.12.59	6007 6319	0	103·5	no reaction	*11.1.60	15%	107·1	3—7
5094	18.2.60	6007 6319	0	105·1	6	*11.3.60	42%	106·7	4—8
5026	3.3.60	5094	0	102·7	no reaction	*25.3.60	20%	107·2	4—8

* = Reinfected with mouse-passaged sheep strain. † = Reinfected with virulent sheep strain.

As is shown in the table very few infected cells were seen in the sheep in the first 2 passages but definite infection was established in the 3rd and 4th passage (sheep 6007 and 6319). No inclusion bodies were seen in sheep 6318 (5th passage) and 2 further attempts to pass the agent from sheep 6007 and 6319 were also unsuccessful. The temperature reactions were mild.

Reinfection. In order to prove their susceptibility to the disease the sheep which had failed to give definite reactions to primary infection with the bovine organism were reinfected with an ovine strain which was being maintained by passage in mice. The resulting reactions in these sheep were moderately

transit and microscopical examination was not possible. The clot was broken up in a homogeniser and inoculated intravenously into a sheep (5084) which reacted positively as is shown in Table II.

Although the organism was not detected in the 2nd passage sheep (5077) there was a considerable temperature reaction. Two immune sheep (3770 and 3806) inoculated with the same material failed to react. The 3rd passage sheep (5994) was reinfected on July 20th with a mouse-passaged sheep strain of virus and showed 20 per cent. infected polymorphs and a temperature of 105·0° F.

A 3rd sample of blood was received from a 3-year-old Friesian cow with a temperature of 105·0° F.

TABLE II
PASSAGE IN SHEEP OF DEVON STRAIN TICK-BORNE FEVER (COW 55)

Sheep number	Date of inoculation	Inoculum	Maximum percentage of infected polymorphs	Maximum temperature °F.	Duration of reaction in days after inoculation
5084	18.6.59	Cow 55	11%	106·0	6—10
5077	25.6.59	5084	0	105·8	4—6
I.S. 3770	25.6.59	5084	0	102·8	—
I.S. 3806	25.6.59	5084	0	102·9	—
5994	3.7.59	5077	0	104·1	—

I.S. = Sheep which had had a previous attack of tick-borne fever from inoculation of a sheep strain of the organism.

Microscopical examination showed inclusion bodies in 29 per cent. of the polymorphs. The blood was inoculated into a Galloway heifer and a sheep and passaged in sheep as is shown in Table III.

Thus although this bovine strain of the organism was maintained through 4 passages in sheep in which it provoked an appreciable temperature reaction with 1 exception (sheep 5992) the numbers of infected cells remained low. The susceptibility of the sheep in which no inclusion bodies had been detected (5996 and 6112) was proved by reinfection with sheep strains of the organism which produced a temperature reaction and inclusion bodies in both.

Cross-immunity Experiment

On September 18th a cross-immunity test in sheep between the bovine strain and a mouse-passaged sheep strain was set up. The details are given in Table IV.

Thus the mouse-passaged sheep strain produced typical reactions in both the uninfected control sheep and in the sheep previously infected with the cow strain, while the sheep previously infected with the homologous strain were immune.

The low infectivity for sheep of the bovine strain prevented any definite conclusions from the second half of the experiment. With the possible exception of sheep 6004 no intracellular inclusions were seen in any of the sheep challenged with the bovine strain

TABLE III
PASSAGE IN SHEEP OF DEVON STRAIN TICK-BORNE FEVER (COW 45)

Sheep number	Date of inoculation	Inoculum	Maximum percentage of infected polymorphs	Maximum temperature °F.	Duration of reaction in days after inoculation
Galloway heifer	30.6.59	Cow 45	6%	104·4	6—8
3819	27.6.59		7%	106·4	4—6
3821	3.7.59	3819	5%	105·7	4—6
*5995	9.7.59	Galloway	2%	106·9	7—12
5996	9.7.59	heifer	0	104·4	3
*5992	20.7.59	5995	40%	107·0	5—8
*6060	27.7.59	5992	2%	105·6	3—9
6041	5.8.59	6060	8%	106·7	5—8
6112	18.8.59	6041	0	104·9	5—6
*5978	23.7.59	Pooled blood 5084, 5077, 3819 3821, 5995	5%	105·8	5—7

* = Sheep used in cross-immunity experiment.

of organism. The mild temperature reactions in both the control sheep and in the sheep previously infected with the bovine strain suggested that reinfection had taken place in these groups. This was confirmed by inoculation of a pooled blood sample from these 4 sheep into another sheep in which inclusion bodies appeared in 8 per cent. of the polymorphs and the temperature rose to 106·3° F. on the 6th day after injection. The strain was maintained in passage in 3 more sheep but was eventually lost.

DISCUSSION

Although tick-borne fever has been recognised in sheep for 25 years and is believed to be enzootic in this species in all tick-infested areas (McLeod, 1936) this is the first recorded outbreak in cattle in Scotland.

TABLE IV
CROSS-IMMUNITY TEST BETWEEN BOVINE AND MOUSE-PASSAGED SHEEP STRAIN OF TICK-BORNE FEVER

Previous infection	Inoculated with 2 ml. pooled blood from 6 sheep infected with a mouse-passaged sheep strain				Inoculated with 2 ml. pooled blood from 5 sheep infected with the bovine strain			
	Sheep number	Maximum percentage of infected polymorphs	Maximum temperature °F.	Duration of reaction in days after infection	Sheep number	Maximum percentage of infected polymorphs	Maximum temperature °F.	Duration of reaction in days after infection
Bovine strain	5992	86%	105·3	5—8	5995	0	105·4	9—14
	5978	58%	104·6	4—6	6060	0	104·4	9
Mouse-passaged sheep strain	5996	0	104·0	—	5991	0	104·0	—
	5994	0	103·8	—	5993	0	103·9	—
None	6009	60%	106·0	4—7	6004	?	104·2	11—12
	6024	68%	106·8	3—8	5976	0	105·2	11

? = Several cells contained atypical inclusions.

The bovine disease has been identified in South West England (Hudson, 1950; Tutt & Loving, 1955; Venn & Woodford, 1956) and in Northern Ireland (Pearson, personal communication). In these areas, as on the Dumfriesshire farm where we have diagnosed the condition, cattle form the major part of the grazing population. This distribution suggests that the disease is caused by a specifically adapted bovine strain of virus which has been transmitted through several generations in cattle rather than an accidental infection with a sheep strain. The absence of records of the disease in cattle on hill sheep farms lends support to this theory. Although considerable numbers of cattle are grazed on these hill pastures the sheep population is large enough to make it unlikely that ticks will feed in successive instars on cattle so that an ox-adapted strain of virus has little chance of developing.

The experimental evidence suggests that there are considerable differences between ovine and bovine strains of the organisms. The difficulty we encountered in infecting sheep with the bovine strain and still more the failure to maintain the strain in sheep to sheep passage is in marked contrast to the ease with which ovine strains can be transmitted and maintained in sheep. This low infectivity of the bovine strain for sheep is also mentioned by Hudson (1950).

A similar low infectivity of ovine strains for cattle has been recorded (Thorshaug, 1939; Foggie, 1951). Hudson, however, infected cattle with an ovine strain supplied from this Institute.

Positive evidence that there are marked immunological differences between strains of bovine and ovine origin was given by the reinfection and cross-immunity tests. It has been shown (Foggie, 1951) that there are immunological differences between ovine strains from different districts. While reinfection with a homologous strain failed to produce a reaction, reinfection with a heterologous strain usually provoked a recurrence of the disease. In these experiments the reaction to reinfection with heterologous ovine strains was almost always very much milder than the primary reactions. In the present series of experiments however the reaction to an ovine strain in sheep which had already reacted to a bovine strain was invariably more severe than the primary reaction. Our cross-immunity test agrees with Hudson's findings that while the ovine strain protected sheep against both the ovine and bovine strains, the bovine strain failed to protect sheep against the ovine strain.

Venn and Woodford noted that the disease in cattle appeared mainly in bought-in animals and postulated that indigenous stock are infected as calves and have an inapparent disease which renders them resistant to further attacks. Our observations support this theory. This incidence is similar to that in sheep on hill farms where the lambs are infected shortly after birth (McEwen, 1947) and the disease is only seen in adult sheep which have been introduced from tick-free areas.

The limited experiments with blood from roe-deer suggested that these animals did not play a part in the disease cycle. We have not, however, attempted to transmit the infection from roe-deer direct to susceptible cattle.

Acknowledgments.—We wish to thank Mr. W. Beaumont, M.R.C.V.S., who supplied strains of bovine tick-borne fever from an outbreak in Devon and Mr. K. McArthur game-warden who supplied the samples of roe-deer blood.

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The Isolation of *Pasteurella pseudotuberculosis* from an Ovine Foetus

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SUMMARY.—The isolation of Past. pseudotuberculosis *from the liver and stomach of an aborted lamb is described. Mention is made of the lesions associated with this infection.*

Introduction

PASTEURELLA pseudotuberculosis was first isolated in 1883 by Malassez and Vignal. Since that time it has been recorded in goats by Baumann (1927) and later by Rajagopalan and Sankaranarayanan (1944); also in the cat, guinea-pig, mouse, hare, rabbit, chinchilla, pig, horse, ox and monkey by various authors. Hassig, Karrer and Pusterla (1949) reviewed 17 cases of infection in man.

Authentic records of infection in sheep with *Past. pseudotuberculosis* are rare and it is evident from a review of the relevant literature that confusion exists between disease due to this organism, other pasteurellae and *Corynebacterium ovis*.

Truche (1938) identified a strain of *Past. pseudotuberculosis* isolated by Gilruth from sheep in Australia. Also in Australia, Pullar in 1932 recorded an outbreak of disease in ewes and wethers characterised by the presence of tubercles in the liver and spleen and occasionally in the associated lymphatic glands. He considered the organism isolated to be *Past. pseudotuberculosis*. Placidi, Santucci and Belot (1951) reported 2 cases of disease in sheep in Morocco, and Jamieson and Soltys (1947) described an epididymo-orchitis in rams in association with this organism.

Kaminski (1959) recovered *Past. pseudotuberculosis* from the liver lesions of a 5-month-old emaciated

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A Note on the Occurrence of Tick-borne Fever in Cattle.—*Concluded.*

sheep which died after a bout of coughing and diarrhoea.

An organism resembling *Past. pseudotuberculosis* was isolated from sheep by Hindmarsh (1931), by Dungal (1931) and by Beveridge (1937); although liver or lung lesions were seen in affected sheep, the organism isolated proved non-pathogenic for laboratory animals.

In the following short article the isolation of *Past. pseudotuberculosis* from an aborted lamb is described.

History

On January 22nd, 1960, an aborted ovine foetus without placenta was received for examination. The aborting animal, one of a Suffolk Cross flock, was in lamb for the first time. The flock consisted of 42 ewes and gimmers which had been folded on sugar beet during pregnancy. Hay was available during the latter half of pregnancy, together with some concentrate feed during the last 4 weeks. Lambing was due to commence on January 29th. The maiden animals had been purchased the previous year from an East Riding flock.

No further animals in the flock aborted, although one other lamb was dead when born, and the lambs of 7 ewes died during the first 24 hours after birth. None of these were submitted for laboratory examination.

Laboratory Examination

Macroscopical examination of the foetus revealed numerous small necrotic foci, 1 to 2 mm. in diameter, distributed throughout the liver substance. No other lesions were seen. Microscopic examination of smears from the liver and stomach of the lamb showed numerous Gram-negative cocco-bacilli with a tendency to bipolar staining; no *Vibrio*-shaped organisms were seen. Smears stained specifically for *Brucella* organisms were examined with negative results.

Cultural Studies

Cultures were made from the liver and stomach on tryptose infusion blood agar, the plates being incubated both aerobically and in 10 per cent. CO_2 at 37° C. After 24 hours' incubation all the plates gave a pure growth of non-haemolytic, round colonies, 1 mm. in diameter, greyish yellow in colour and with a tendency to "brown" the surrounding medium.

Cultures in nutrient broth gave a uniform turbidity with a slight deposit after 24 hours' incubation at 37° C. The organism was non-motile at this temperature.

The organism was sub-cultured on to a triple sugar iron agar slope (Difco) and incubated for 24 hours at 37° C. Examination of the culture showed an acid butt and alkaline slope, there was no H_2S produced.

On MacConkey agar there was a moderate growth of pale yellow colonies.

Biochemical Reactions

Fermentation reactions were tested over a period of 4 days. Acid but no gas was produced in glucose, mannite and maltose. Neither acid nor gas was produced in lactose and dulcite. The indole and Voges-Proskauer reactions were negative but the methyl red test was positive. The organism produced catalase.

Experimental Pathogenicity

Intramuscular inoculation of 1 ml. of a 24-hour broth culture of the organism proved fatal for a guinea-pig after 18 days. *Post-mortem* examination revealed discrete, granulomatous lesions throughout the liver, spleen and lungs. There were no kidney or intestinal lesions At the site of inoculation there was an abscess and in the surrounding muscle were a few small necrotic foci. Cultural examination of the liver and spleen gave a pure growth of an organism indistinguishable from that originally isolated. These findings confirmed the identity of the organism as *Past. pseudotuberculosis*.

Histological Examination

Sections prepared from the liver of the foetus revealed the presence of two types of lesions. These were distributed irregularly throughout the tissue.

An older type of lesion was surrounded by a zone of fibrous tissue with a clear area of demarcation between the foci and the normal liver tissue. The centre of the lesion consisted of degenerated liver cells with a few neutrophils and larger numbers of lymphocytes. No giant cells were seen.

More recent lesions were similar to those seen on section of the guinea-pig liver tissue. Diffuse inflammatory areas were present with central necrosis; no fibrous capsule separated these zones from normal liver tissue. The centres of the areas consisted mainly of macrophages with some neutrophils and a few mononuclear cells. Sections both from the foetus and the guinea-pig stained by Gram's method showed the presence of small numbers of Gram-negative cocco-bacilli. The organisms were present in both types of lesion.

Discussion

It is difficult to assess the significance of *Past. pseudotuberculosis* as a cause of the abortion but it is possible that it was responsible for this in view of the lesions present in the foetus and a failure to demonstrate any other cause. Thus, serological examinations for *Toxoplasmosis gondii* and for enzootic abortion proved negative in the ewe which aborted and in three other ewes in the flock. Unfortunately no placenta was available for examination and it is not known whether this contained any lesions. Following abortion, the ewe remained perfectly healthy and was the only animal in the flock to abort. It is not known how the infection was contracted.

Acknowledgments.—We wish to express our thanks to Dr. A. H. Linton of the Public Health Laboratory Service, Bristol, for confirming the identity of this organism, and M. W. Maclean, B.SC., M.R.C.V.S., for bringing this case to our notice.

(Concluded at the foot of col. 1 overleaf)

Toxocara canis as a Hazard to Public Health

BY

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SUMMARY.—The rôle of Toxocara canis *in the causation of* visceral larva migrans *in man and in the domestic animals has been outlined. The danger, particularly to young children, which may result from keeping young puppies and nursing bitches as domestic pets is stressed. The measures which may be taken to reduce the hazard of* T. canis *infestation in man are given in detail.*

ALTHOUGH Fülleborn (1921) suggested that man might act as an intermediate host for *Toxocara canis* it is only recently (Beaver *et al.*, 1952), that the larvae of that nematode have been identified in human tissue. This and subsequent work, reviewed by Beaver (1956), demonstrated that the wanderings of the larvae of *T. canis* and other ascaridoid nematodes of the dog and cat were responsible for the clinical syndrome known as *visceral larva migrans*; a condition which upon occasion has resulted in death.

The condition has not been diagnosed in Great Britain but Ashton (1960) has shown that granulomatous lesions in the enucleated eyes of 4 children were in fact caused by *T. canis*. In veterinary medicine the possible pathogenic rôle of the ascaridoid nematodes of the dog and cat in other domestic animals has not been recognised but a recent publication (Done, Richardson & Gibson, 1960), has provided experimental proof of the potential pathogenicity of *T. canis* in the pig.

Although the life history of *T. canis* has been assumed to be similar to that of *Ascaris lumbricoides*, recent work by Sprent (1958) has shown that there are distinct differences between the life histories of the two species. Sprent demonstrated that prenatal infection appears to be the rule in puppies and at birth third-stage larvae of *T. canis* are present in the lungs. By the second week of life fourth-stage larvae were present in the intestines of the puppies and the adult stage was reached a little later. Eggs did not, however, appear in the faeces before the end of the third week. When puppies 1 to 3 weeks old were experimentally infected with eggs of *T. canis* the larvae migrated to the liver and lungs and subsequently to the intestine where they developed to the adult stage. When, however, infective eggs were administered to dogs over 5 weeks old the larvae migrated to the somatic tissues and remained in the second stage. Yutuc (1949) and Webster (1958) demonstrated that second-stage larvae present in the somatic tissues of the bitch are mobilised during pregnancy and that they migrate to the foetus giving rise to a prenatal infection. Douglas and Baker (1959) demonstrated that in pregnant bitches invasion of the foetus does not occur before the 42nd day of gestation and that *T. canis* larvae require at least 14 days following infection before they invade the tissues of the uterus and foetus. Bitches were infected during their first pregnancy and then kept free from infestation. These bitches whelped for the second time 241 to 385 days after the initial infection and all litters developed patent *T. canis* infections within 23 to 40 days of whelping. All the bitches developed patent infestations within 25 to 46 days of whelping but these infestations were spontaneously cast off 9 to 108 days later. Sprent and English (1958) record that puppies may pass as many as 15,000 eggs per gramme of faeces, but that dogs over 6 months old are less heavily infected and in still older dogs only very light infestations are encountered. The important practical considerations of all this work may be summarised by saying that the most important source of infective material is the young puppy, and that bitches store larvae in their somatic tissues which give rise to prenatal infections in their litters.

The close association between man and his domestic pets favours the ingestion by the human being of eggs of *T. canis;* the unhygienic habits of children render them particularly prone to this hazard. In man the larvae migrate to the somatic tissues and he acts as a paratenic host for the parasite. There have been records of man acting as the final host of *T. canis*, but these are of doubtful validity and in any case are exceptional. The migration of the second-stage larvae of *T. canis* in the tissues of man gives rise to the condition which has been termed *visceral larva migrans*. The symptoms produced are variable but a constant finding is persistent eosinophilia. Frequently medical advice is sought on account of intermittent fever, loss of appetite, failure to gain weight, cough, muscle

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The Isolation of *Pasteurella pseudotuberculosis* from an Ovine Foetus.—*Concluded.*

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and joint pains, abdominal pain or neurological disturbances. The condition is most common in young children and frequently there is a history of dirt eating and an association with dogs. Although diagnosis may frequently be made on clinical grounds, confirmation requires liver biopsy followed by the examination of serial sections for the presence of ascaridoid larvae. The work of Nichols (1956) has greatly simplified the specific diagnosis of larvae observed in sections, but the necessity for liver biopsy results in many cases of this condition remaining undiagnosed. Although the illness may be protracted, alarming symptoms are unusual and uneventful recovery follows. Death has, however, occurred and where migration of the larvae in the central nervous system causes neurological disturbances the sequelae can be serious.

The discovery by Wilder (1950) of nematode larvae in eosinophilic granulomata in the enucleated eyes of children suspected of retinoblastoma suggests that *visceral larva migrans* may from time to time simulate retinoblastoma and result in unnecessary enucleation of the eyeball. Ashton (1960) has also reported 4 cases of granulomatous lesions in enucleated eyes caused by the larvae of *T. canis*.

Although Innes *et al.* (1952) have shown that certain nervous diseases of goats are caused by the migration of *Setaria* spp. through the central nervous system, there has hitherto been no proof that *visceral larva migrans* caused by the ascaridoid worms of the dog occurs in any of the domestic animals. The recent work of Done, Richardson and Gibson (1960) has, however, provided experimental proof that the disease can occur in pigs and it seems possible that sheep which have a relatively close association with dogs may also be affected. Although in many instances the artificially induced disease in pigs was not characterised by pathognomonic clinical signs, there was in all instances a considerable reduction in weight gain. It is also noteworthy that of 5 pigs kept under observation for 28 days or longer, 3 showed severe nervous involvement which necessitated slaughter. In pigs, nervous symptoms do not occur in the early stages of the disease when the larvae are undergoing active migration but rather when migration ceases and the tissues begin to react to the presence of the dead or dying larvae. The existence, in the field, of clinical *visceral larva migrans* has not yet been proved but in an outbreak of disease in pigs, at present under investigation, clinically bears a close resemblance to the artificially induced disease.

Although this paper has been mainly concerned with the rôle of *T. canis* in the causation of *visceral larva migrans* in man and domestic animals, *T. cati* and *Toxascaris leonina* may also be involved. These ascaridoid nematodes do not commonly cause much ill health in dogs and cats and it is only heavy infestations in young animals which call for veterinary attention. Reliable anthelmintics exist for their removal and they do not present a particularly serious problem to the veterinarian. These parasites do, however, constitute a serious public health problem and the veterinarian has a vital rôle to play in the prevention of *visceral larva migrans* in man. The incidence of these parasites has not been reliably estimated in any country of the world but such surveys as have been carried out show that the chief sources of infective material are young puppies and pregnant bitches. Since it is the habit of nursing bitches to ingest the faeces of their offspring during the suckling period and the eggs in the ingested faeces pass through the bitch unharmed she will, in this way, disseminate infective material widely. The environment of bitches and puppies becomes heavily contaminated and as the eggs are very sticky they may adhere to toys, rugs and other articles in the home. Control of worms in dogs is, therefore, of paramount importance in the prevention of *visceral larva migrans* in man and the following measures are suggested.

After purchase dogs should receive effective anthelmintic treatment. With puppies it is important to eliminate the worms before the prenatal infection becomes patent and treatment 14, 21 and 28 days after birth is advised. Repetition of treatment at 2 months of age is desirable. Dogs purchased at 3 to 6 months of age should be treated twice with an interval of 1 week between the treatments and dogs over 6 months should receive at least one treatment. Bitches with puppies should be isolated from children. During the suckling period the bitch's faeces should be collected and burnt and care should be taken in handling the bitch or her puppies for the sticky eggs may adhere to the coat and be transferred to the hand in fondling the animals. Puppies should not be allowed in the house until they are fully house trained, for a small pellet of dried faeces ingested by a child might contain sufficient eggs to cause serious damage. Some authorities advocate the removal of dogs and cats from households where there are children, but if children's pets are retained treatment on the lines just discussed should be adopted. The practice of allowing dogs to defaecate in children's playing fields is to be deprecated for this creates a hazard to young children.

Many different anthelmintics have been recommended for the removal of round-worms from the dog but it is only necessary to mention some of the more recently introduced compounds which have come into general use. Hewitt *et al.* (1947) used diethylcarbamazine and since then it has been widely used at a dose rate of 50 mg. per kilogram of bodyweight. Sloan, Kingsbury and Jolly (1954) showed that piperazine adipate was extremely effective in removing round-worms from the intestine of the dog and cat; a dose rate of 100 mg. per kilogram of bodyweight being recommended. Subsequently Sprent and English (1958) conducted preliminary experiments on the value of piperazine adipate for the removal of immature worms from puppies. A dose rate of 200 mg. per kilogram was found to be effective in the removal of a large proportion of the immature worms carried by puppies. The possibilities of preventing the prenatal infection of puppies with *T. canis* by the administration of piperazine citrate to bitches during pregnancy was investigated by Hayes

(*Concluded at the foot of page* 774)

Adjourned Annual General Meeting of the B.V.A.

The adjourned Annual General Meeting was held in the Bute Hall, the University, Glasgow, at 9.30 a.m., Saturday, September 3rd, 1960. The retiring President, Mr. S. L. Hignett, was in the chair.

Votes of Thanks

Mr. H. F. Hebeler, Senior Vice-President, moved a vote of thanks to the Court of the University of Glasgow. That ancient seat of learning had been more than kind to the Association in all the facilities it had allowed. The Association had been given space in the Bute Hall, space in the Engineering building, and had been permitted the use of the Men's Union and the use of the Queen Margaret Union; on Sunday evening, there had been a very pleasant service in the very fine chapel. Facilities had also been made available for the showing of films, for the trade exhibition and for the scientific exhibition. There had been a most pleasant reception at Garscube, where the accommodation available for the television demonstrations, and for people to go round and see the work done there, was very good indeed.

Mr. T. Denholm, Honorary Secretary, moved a vote of thanks to the Lord Provost and Corporation of the City of Glasgow. It was an honour and pleasure for him to do so because he was born in Glasgow, went to school in Glasgow and finally passed through the Glasgow Veterinary College.

The very warm welcome extended to the Congress and the very generous hospitality enjoyed by everyone at the Reception in the City Chambers on Monday evening would long be remembered.

Dr. E. Cotchin moved a vote of thanks to the authors of papers, openers of discussions and to those who provided demonstrations of a scientific nature.

For the past three years, he had been privileged to serve the Association as its Honorary Treasurer, a privilege for which he would always be grateful. That service had given him an insight into the inner working of the Association. In those years, he had been particularly impressed by the enormous extent of the goodwill that existed in the Association. Whenever anyone had been asked to do anything, the answer was " Yes, what exactly do you want me to do?" Straight away, that fund of goodwill could be drawn upon. That had been particularly evident in connexion with arrangements for the Congress.

The Congress had been a wonderful one from the scientific point of view. In moving the vote of thanks, he mentioned particularly Smith Kline and French for providing the closed-circuit television.

Mr. S. Jennings moved a vote of thanks to Messrs. Pharmaceutical Specialities (May and Baker) Ltd. As members arrived at the University and Queen Margaret Union, the first thing put into their hands, which gave them their first insight of the Congress, was the cheery handbook. Its fund of information had been of constant use. They were indeed grateful to May and Baker for the production of the delightful programme.

A debt of gratitude was also owed to the other commercial firms which had done so much towards the success of the Congress.

Mr. A. G. Beynon moved a vote of thanks to the B.B.C., A.T.V. and the Press. The Association had never had better coverage of its proceedings during the whole existence of Congresses. At long last, the activities of the Association and the quality of the papers presented at the

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Toxocara canis **as a Hazard to Public Health.**—*Concluded.*

and McDaniel (1959). They gave the drug daily at the rate of 100 mg. or 200 mg. per kilogram of bodyweight or at 10-day intervals at the rate of 200 mg. per kilogram of bodyweight but it was without effect.

Although it is impossible at present to prevent the prenatal infection of puppies, the hazard of *visceral larva migrans* to man or to domestic animals other than the dog can nevertheless be greatly reduced by the routine use of piperazine adipate to remove immature *T. canis* from puppies before the worms begin to lay eggs. The routine treatment of all pets immediately after purchase will also reduce the general incidence of *T. canis* and consequently the incidence of *visceral larva migrans.*

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Congress were being recognised. The Association was particularly indebted to the Press, the B.B.C. and the A.T.V. for the way in which they had covered the Congress.

Mr. S. L. Hignett moved a vote of thanks to the President and other members of the West of Scotland Division of the British Veterinary Association. For months, members of that Division, particularly Mr. Alex Thomson and Mr. Roddy Campbell, the Chairman and Local Secretary respectively, had served on the Provisional Committee and had worked unceasingly to ensure the success of the Congress. It would be agreed that they had certainly not laboured in vain. The Congress had had a wonderful start when members were entertained by the West of Scotland Division on Sunday night. He also paid tribute to the Ladies Committee. The hard work and efficiency of that great-hearted band of supporters had been abundantly clear to all who had sailed down the Clyde, or gone on any other excursion. At the same time, he expressed the Association's thanks to Mrs. Mitchell and to Mrs. Alex Thomson and others of the Ladies' Guild for the magnificent dance on Thursday night. Everyone would agree that it was the most enjoyable and efficiently run function they had ever had on any Congress occasion.

The Association was indeed proud of the Guild's achievements in raising so much money for the very deserving charity, the Victoria Veterinary Benevolent Fund.

The vote of thanks was carried by acclamation.

Mr. Hignett said that he had already referred to the great work of Mr. Alex Thomson, Chairman of the Provisional Committee, and the great work of Mr. Roddy Campbell, the Local Secretary. To mark the occasion, and in appreciation of all they had done, he asked Mr. Campbell to accept a picture as a small token of great appreciation of his work during the last 9 or 10 months. (*Applause.*)

Mr. R. Campbell thanked Mr. Hignett for his remarks which were deeply appreciated. It would have been clear to all the delegates that the work had been a team job; it was quite impossible for him, as Local Secretary, to acknowledge his indebtedness to all the people who had been so helpful over the arrangements for the Congress.

He expressed his appreciation to the President and all members of the Association concerned in the presentation. (*Applause.*)

Messages from Overseas Delegates

Professor C. A. McGaughey (Ceylon) brought greetings and good wishes from the Ceylon Veterinary Association, and took the opportunity of thanking the President and Council for their great kindness at the very successful and enjoyable Congress.

Dr. R. F. Sterne (South Africa) conveyed to the Congress and to the Association the greetings of the South African Veterinary Medical Association. It had been a privilege to attend the most successful Congress.

Presentation to Mr. F. Knight

Mr. S. L. Hignett: "As I mentioned earlier this week, Mr. Knight, our General Secretary, retires in November. To mark the occasion, it is the unanimous wish of Council that he will accept a small token of our esteem and affection. It is our wish that this cheque be spent on something that he and Mrs. Knight would both like to do, preferably something they have longed to do.

"We are most anxious, Mr. Knight, that this cheque should not just be deposited in the bank to be mixed up with the finances of the Knight household. We are hoping that you will spend the money on a cruise during the coming winter. In any case, we hope that, occasionally, when you and Mrs. Knight have time to sit and think, you will conjure up very happy memories of the B.V.A.

"In making this presentation, Mr. Knight, may I on behalf of all members of the Association, wish you and Mrs. Knight good health and long life during which you may enjoy the fruits of your labours."

The cheque was presented to Mr. Knight amid prolonged applause.

Mr. Hignett then called upon Dr. Montgomerie, Chairman of the Trustees of Staff Superannuation and Benevolent Fund to make an announcement.

Dr. R. F. Montgomerie: "In its wisdom, the Association decided to establish a benevolent section to the Staff Superannuation Fund, and I and my colleagues as trustees, Mr. George Gould and Mr. Bywater, have been husbanding the money which the Association has been good enough to put at our disposal. The occasion has come when we start disbursing. It is going to be my pleasure in a minute to present this cheque to Mr. Knight as a gift through the trustees from the Association. Unlike the one which Mr. Hignett has just handed to him, this one is clearly designated to go into the general account of the Knight family.

"Perhaps I should go on and say that it was very generous of you, Mr. President, your Officers and Council, to endorse the line which the Trustees wished to take."

The cheque was presented amid further loud applause.

Mr. Knight, in replying, said: "Thank you very much indeed for the support you have given to the kind remarks of the President. To me, this will be a very memorable meeting. I am most grateful for the gift, and I am sure it will also give pleasure to my wife and that she will enjoy sharing in the use to be made of it for the benefit of us both.

"I should also like to take this opportunity of thanking Dr. Montgomerie and the other Trustees of the Staff Superannuation Scheme and also the Council for the sympathetic consideration given to the question of my pension, and for the arrangements made. Also for this cheque, which will be dealt with in the manner suggested." (*Applause.*)

Mr. S. L. Hignett: "Before I come to my final duty as your President, there is something I would like to interpose. What I am about to say is said with the utmost sincerity. I feel that I just have to take this opportunity of paying a very special

tribute to the retiring Senior Vice-President. (*Applause.*) Without fear of contradiction, I can state that he is one of the most outstanding Officers that this Association has ever had. (*Applause*). Still a comparatively young man, he has the head of an elder statesman. Each one of our problems with which he is confronted is given careful, detailed and quite expert consideration. Fortunate are we that he has agreed to continue to serve us now as our Honorary Treasurer."

Induction of New President

The retiring President (Mr. S. L. Hignett) said that he now really came to his swan song, when he relinquished his symbols of office and stood down in favour of his successor.

It was a very long time since a man who had done so much for the Association over a period of many years had eventually succeeded to its highest office. As retiring President, he thanked Mr. Jennings for all the help so unselfishly given to him during the past year. He assured Mr. Jennings that it was the intention of his fellow Officers to give like support during the months that lay ahead.

Mr. Hignett then invested Mr. Jennings with the Presidential Chain of Office, Cap and Gown, to the accompaniment of prolonged applause.

The President (Mr. Jennings), in response, said that during the last 25 years, he had witnessed the placing of the Chain of Office on many Presidents, and it was not until after the events of a year ago that he ever wondered what the experience would be like. He confessed that, as he stood there, the Chain of Office appeared to be a great weight, heavier than he had ever thought it could be. He was comforted by the fact that he would have the counsel of his fellow Officers.

It was his first pleasant duty, one tinged with a little sadness, to thank the retiring President for all he had done for the Association during the past year. His efficiency had been one of his outstanding qualities and one which had certainly appealed to himself. In his contacts with many outside bodies and with individuals, his friendliness, which had been infectious, had been used to great advantage for the Association. (*Applause.*)

Presentation of Awards

The President then announced the winners of the William Hunting Awards for the best clinical papers published in THE VETERINARY RECORD during 1959.

Section I

1st, P. J. Dalton, M.R.C.V.S., Salisbury: "Erythrocyte Sedimentation Rate as a Guide to the Radiosensitivity of Neoplasms" (*Vet. Rec.*, No. 3).

Equal 2nd, M. B. Toosey, M.R.C.V.S., Wimborne: "The Uses of Concentrated Pentobarbitone Sodium Solution in Bovine Practice" (*Vet. Rec.*, No. 2), and G. L. B. Henderson and E. K. Keywood, MS.R.C.V.S., Surbiton, "An Osteodystrophy in Siamese Kittens" (*Vet. Rec.*, No. 16).

Section II Articles of a Clinical Nature by veterinary surgeons qualified less than 5 years

1st, L. W. Mahaffey, B.SC., M.R.C.V.S., Animal Health Trust, Newmarket: "Ganglionic Lesions in Grass Sickness of Horses" (*Vet. Rec.*, No. 9).

2nd, M. E. A. Rex, M.A., M.R.C.V.S., Cambridge—"The Effect of Surgical Intervention in a Case of Chronic Pulmonary Osteoarthropathy in the Dog" (*Vet. Rec.*, No. 20).

The Annual General Meeting then terminated.

CASE REPORTS AT CONGRESS

One of the innovations at the Glasgow Congress was the holding of case reporting sessions, one on small animals, the other on farm-animal cases.

These reports were presented by the staffs of the clinical and pathology departments of five veterinary schools. Each case was described verbally with coloured transparencies in periods not exceeding five or ten minutes. Each presentation was followed by a discussion period of five minutes. The chairmen ran both sessions strictly to time and indeed finished their sessions ahead of schedule.

Judging by the enthusiastic response and large audiences this is an experiment which should be repeated and it is hoped that future organising committees will invite practising veterinary surgeons to present cases in a similar manner to what, after all, is a predominantly clinical audience.

A list of the titles of the case reports and their authors is given below:—

Spinal Abscess in a Calf, E. A. McPherson, J. B. M. Gellatly, Edinburgh.

Laryngeal Hemiplegia in the Horse, W. R. Cook, C. Formston, London.

Hypertrophic Pulmonary Osteoarthropathy in the Horse, J. R. Holmes, Bristol.

Dentigerous Cyst in the Horse, S. Jennings, Glasgow.

Seminal Vesiculitis in a Bull associated with Brucella abortus, P. G. Hignett, Glasgow.

Carcinoma of the Bladder with Hydronephrosis in a Cow, W. I. M. McIntyre, Glasgow.

The above cases came under the category of Large-Animal Case Reports.

The Small-Animal Case Reports were as listed below:—

Diabetes Insipidus in the Dog, W. A. Greig, Glasgow.

Cardiological Studies in the Dog, A. G. Singleton, M. C. B. O'Malley and J. B. Dixon, Liverpool.

Mammary Carcinoma with Metastases in the Dog, P. N. Leahy, Glasgow.

Tuberculosis in the Dog, I. M. Lauder, Glasgow.

Fibromatous Epulis in the Dog, D. D. Lawson, Glasgow.

Reticulum-Cell Sarcoma in the Dog, W. F. H. Jarrett, Glasgow.

Haemangiosarcoma of the Spleen in the Dog, J. R. Campbell, Glasgow.

Peptic Ulcer and Hepatic Cirrhosis in the Cat. R. G. Dalton, Glasgow.

International Conference of Veterinary Food Hygienists

From a Correspondent

THE second Symposium of the International Association of Veterinary Food Hygienists was held at Basle from May 16th to 21st, 1960. The following are some of the papers and contributions presented which may be of interest to veterinarians in Britain. Dr. Bartels (Germany) dealt with the necessity for uniformity in *ante-* and *post-mortem* inspection of animals, in slaughter and plant sanitation, and in meat transport hygiene in relation to those countries which have formed an economic unit such as the Common European Market and small Free-Trade Zone. Uniformity of meat inspection laws has been in existence for 2 years in those countries comprising The European Economic Federation.

Dr. Radan (Israel) discussed the relationship between the *p*H of the carcase and certain of the organs showed that the *p*H of lymph nodes in 90 per cent. of cases was higher than that of the meat. When the *p*H of the meat was less than 6.5 the *p*H of the liver and spleen of the animal exceeded this figure, whereas when the *p*H of the meat was higher than 6.5 the *p*H of the liver and spleen was lower than that of the meat.

Experiences with the preservation of foods of animal origin by use of ionising radiation were recounted by Capt. R. W. Baker (U.S.A.) who pointed out that the criteria which must be satisfied in the new form of food processing are:—

1. The food must be safe to eat (physiological investigations in regard to wholesomeness and nutritional adequacy of irradiated foods have largely been conducted on monkeys, rats and dogs).
2. The product must be organoleptically acceptable.
3. The process must be economically feasible.

The use of irradiation on foods was discussed in relation to the feeding of armed forces. Dr. Thieulin (France) dealt with the effect of ionising radiation on the bacteriological flora and showed that an irradiation of 375,000 r. appears to destroy bacteria belonging to the *Salmonella, Escherichia coli* and Pseudomonas group. Though such results are encouraging, it was stressed that further investigations must be made before the process could be applied on a commercial scale. Dr. van Keulen (Holland) pointed out the necessity for complete destruction of radioactive carcases and organs of domestic animals and stated that the ordinary destruction plants were unsuitable for this purpose as the resultant meat meal and technical fat might still remain contaminated.

Dr. Janiak (Switzerland) dealt with the effect of tranquillisers used as food additives for animals and stated that an additional effect of these was to relax the muscles and reduce the blood pressure, thus producing better bleeding when the tranquillised animal was slaughtered; he claimed further that tranquillisers enhance the quality and keeping properties of the meat. On the other hand Dr. Käppeli (Switzerland) pointed out the public health danger in poultry castrated by hormone injection and stated that the Allen-Doisy mice test was efficacious in demonstrating the presence of oestrogens in fattened poultry.

The justification for public slaughterhouses was dealt with by Dr. Allenspach (Switzerland), a timely contribution when there is a tendency for the number of private, commercially-run establishments to increase which may constitute a source of direct competition to nearby municipal abattoirs. Municipal abattoirs, however, were likely to remain, he thought, and were indispensable provided they were capable of adapting their organisation to modern practices; such practices include line slaughter which, in the case of small and medium-sized abattoirs, has so far only been applied satisfactorily to the slaughter of pigs. Though semi-mechanisation may not bring about any increase in production per man-hour, it greatly eases the physical work entailed and secures significant improvements in hygiene. Dr. Hess (Switzerland) dealt with blood splashing in the musculature of pigs and stressed the importance (a fact already known to those with practical experience of slaughtering) of bleeding the animal as rapidly as possible after stunning.

The contribution by Linderholm (Sweden) on vacuum-packed meat products was timely in view of the great increase of such foods in recent years. The sales argument that vacuum packing greatly extends the shelf life of meat was discussed and the author suggested that such a claim was greatly exaggerated.

Dr. Sens (of Germany) pointed out that as prepacked meat foods may be spoiled in spite of their apparently normal external appearance, wrappings should be marked to indicate the date of manufacture. Among several contributions dealing with the use of antibiotics to prolong the storage life of fish, investigation by Japanese workers showed that the decomposition process in fish so treated produces a peculiar odour which was distinct from that of ordinary decomposition. Such change was brought about by the very rapid multiplication of resistant organisms, the majority of these being of the non-putrefactive type and belonging to *Achromobacter-pseudomonas. Flavo-bacterium* group or other psychrophilic bacteria.

There were a number of valuable contributions on *Salmonella* bacteria and the infections produced by them. Dr. Clarenburg (Holland) mentioned that such infections in both man and animals had increased in recent years. Dr. Kampelmacher (Holland) and others discussed the rôle played by slaughter pigs as healthy *Salmonella* carriers and stressed the importance of uninterrupted refrigeration from producer to consumer in minimising the danger. Dr. Dräger (Germany) stated that in bacteriological examination of slaughtered animals *Salmonellae* were chiefly found

(*Concluded at the foot of col.* 1, *p.*778)

Current Literature

REPORT

Report of the Agricultural Research Council, 1958-9 (H.M.S.O., 9s.)

One has come to expect a high standard of presentation in Government reports, and the 1958–9 report of the Agricultural Research Council is no exception. In readability and streamlined summarisation of a mass of information it is first-class. Its 213 pages are a record of considerable achievement and are worth careful study by all who are interested in the scope of agricultural research in Britain.

The report is divided into the following sections : Introduction, Administration and Finance, Some Aspects of Agricultural Research, Research Studentships and Fellowships, Special Research Grants, and Reports from Agricultural Research Institutes and Units. At the end of the report there are lists of State-aided Agricultural Research Institutes, Agricultural Research Council Institutes and Units, Scientific Staff not Attached to Institutes or Units, and The Council's Committees and Conferences.

Since it is impossible to review so great a mass of material coherently within the limits of a few hundred words, comment has been restricted to those parts of the report that are of special veterinary interest.

Firstly, the INTRODUCTION. Under this heading certain general topics are discussed and an indication of the Council's attitude towards each is given. *Food Research* is research into " the production, handling, storage, packaging and processing of food as links in one continuous chain of operations. . . ." *Farm Buildings Research* is directed towards making available to the farmer and the architect all the knowledge at present available, to finding out as much as possible about the efficiency of existing buildings, and to encouraging the scientific development of new ideas in the design of farm buildings. *Monitoring of Radioactivity in the Food Chain* has been continued and expanded. The complex question of *Financing Research in the Universities* has been kept under review ; one of the major problems to be solved is to what extent the Council can give prolonged support (*i.e.* beyond the usual three-year period) to specific research projects within universities. The Council has been giving special consideration to *Feeding Standards for Livestock*, since new knowledge indicates that certain time-honoured methods of preparing rations for animals may be inadequate. A committee has been set up to deal with this problem. The Council is interested to develop *Blood Group Typing in Cattle* in Britain and has been supporting research into the problems involved. Finally, in this introductory section, the question of *Synthetic Oestrogens and Antibiotics* in animal feeding-stuffs is discussed. The Council has arranged for experiments to be carried out " to determine how far the feared dangers from feeding synthetic oestrogens are real." Regarding antibiotics, the conclusion is reached that the Council " cannot at present advise the wider use of these substances in animal feeding-stuffs."

Secondly, ADMINISTRATION AND FINANCE. Items of veterinary interest concern Staff, Scientific Committees, and the Agricultural Research Fund. At the close of the year under report there were 4,115 members of staff employed at the agricultural research institutes. Of this number 817 were in the Scientific Officer class, and some 59 of these were veterinary surgeons. A disappointing veterinary item appears in the paragraph headed " Scientific Committees " :—

" The Veterinary Therapeutic Testing Board, set up in 1957 to administer a scheme for the impartial testing of substances used or ordered for use in veterinary medicine, has continued its work but, as in the previous year, there have been few applications for it to consider and in no case was a full-scale trial initiated." It is to be hoped that this lack of interest in the Veterinary Therapeutic Testing Board will be remedied in the near future. The Technical Committees on Brucellosis, Calf Diseases, Johne's Disease, and Mastitis, and the Conference of Workers on Mastitis were dissolved during 1958-9, and their place was taken by a Technical Committee on Sheep and Cattle Diseases, 8 of the 9 members being veterinary surgeons. The greater part of the Council's expenditure was met from the Agricultural Research Fund and gross current expenditure in the financial year ended March 31st, 1959, was £3,916,981.

Thirdly, SOME ASPECTS OF AGRICULTURAL RESEARCH. This section runs to 76 pages and contains 8 authoritative articles of " refresher " type (with references) on topics of wide general interest. Veterinary readers will find of particular value those on Foot-and-mouth Disease, Blood Types in Cattle, Metabolic Diseases of Ruminants, and Quality in Milk.

International Conference of Veterinary Food Hygienists.—*Concluded.*

in pigs and that a latent infection was likely to become systemic in pigs exhausted and weakened by hunger. The danger in congregating animals for unduly long periods in lairages was stressed, together with the need for a regular supply of animals which had been properly rested and adequately fed. Dr. Slavkov (Bulgaria) described his investigations into the resistance of *Salmonella* in soil, and survival periods of 120 to 150 days were recorded, a prolonged viability which was of obvious importance when investigations are made as to the source of outbreaks.

Dr. Kästli (Switzerland) dealt with milk sterilised through ultra high temperature flash heating (Uperisation), a method especially recommended when milk had to be transported long distances and continuous cooling was not possible. The temperature and time of pasteurisation adopted in Japan was dealt with in a contribution by Dr. Matsui and there were contributions on the survival of *Str. agalactiae* and *Mycobacterium tuberculosis* in certain cheeses.

Those interested will be able to read a full report of the papers and discussions which, in due course, will be published in booklet form by the International Association. H. T.

Fourthly, RESEARCH STUDENTSHIPS AND FELLOWSHIPS. Research studentships are intended to help young graduates to take a further course of study (in some cases a veterinary training), or to undertake a specific research project under supervision. Twenty-six awards were made in 1958. Two of these were Veterinary Studentships, and 6 were for the study of subjects of veterinary interest. At March 31st, 1959, 70 students were in training of whom 18 were engaged in zoology or veterinary science. No Veterinary Research Fellowships (tenable for 3 years by veterinary graduates with not less than 3 years' post-graduate experience) were awarded during 1958–9.

Fifthly, SPECIAL RESEARCH GRANTS. Special grants made to various university departments are listed, and grants to all the veterinary schools are recorded.

Sixthly, REPORTS FROM THE AGRICULTURAL RESEARCH INSTITUTES AND UNITS. These reports from the 43 Institutes and Units cover 99 pages. Three are concerned primarily with animal diseases, namely the A.R.C. Field Station at Compton, the Foot-and-mouth Disease Research Institute at Pirbright, and Moredun Institute in Edinburgh. The Compton report deals with work on brucellosis, bovine mastitis, Johne's disease, scrapie, the breeding of polled Ayrshire cattle, animal ecology, clinical pathology, pneumonia in pigs, radiobiology and haematology. From Pirbright aspects of foot-and-mouth disease research mentioned are epidemiological surveys and immunological typing of virus strains, live vaccines, susceptibility of different genetical lines of mice to different strains of virus, pathology and experimental cytology, *in vitro* antibody tests, infective ribonucleic acid, freeze drying of virus and vaccines, virus aerosols, and the inactivation of virus in skim milk. The notes from Moredun concern Johne's disease, sheep pneumonia, scrapie, hypomagnesaemia, osteodystrophic diseases of sheep, and parasites and parasitic diseases of sheep.

Finally, THE COUNCIL'S COMMITTEES AND CONFERENCES. An indication of the part played by veterinary surgeons in assisting and advising the Council is given by the following figures :—

Committee	*Total number*	*Number of Veterinary surgeons*
Standing committee on research affecting animals	20	6
Veterinary Therapeutic Testing Board...	13	7
Northern Poultry Committee	8	1
Foot-and-mouth disease	8	4
Nutrient requirements in farm livestock	8	1
Pig research	13	5
Poultry research	8	2
Scrapie research	9	5
Diseases of sheep and cattle	9	8
Farming activities	8	1
Carcase quality studies	15	1
Collaborative tests of protein quality in animal feeding-stuffs	22	1
A.R.C. scholarships committee ; zoology group	6	2
Joint A.R.C./M.R.C./D.C. committee on biological problems (non-medical) of nuclear physics...	14	2
Managing sub-committee on monitoring	12	1

ABSTRACTS

Action of Penicillin, Chloral Hydrate, and Chlorate on Some Metabolic Aspects of Ruminal Flora. (Translated title). Oyaert, W., and Bouckaert, J. H. (1959). *Zbl. Vet.* **6.** 693.

The authors found that penicillin and chloral hydrate *in vitro* inhibit the fermentation of glucose and other monosaccharides. Deamination of amino-acids was also inhibited. Doses of penicillin higher than 20,000 Oxford units in sheep and 200,000 units in cattle provoked anorexia and diarrhoea. Neither amylolysis nor proteolysis were affected by penicillin or chloral hydrate. However, after administration of chloral hydrate the amylolytic activity of ruminal fluid was increased. Chloral hydrate and chlorate inhibit *in vitro* the breakdown of lactate.

In their discussion the authors conclude from the experiments that penicillin interferes with rumen bacterial metabolism and that the beneficial effect in bloat is due to suppression of fermentation since carbohydrate and amino-acid breakdown are greatly inhibited. The symptoms of ill health observed could not be explained on the basis of their current investigations, though the responsible factor was believed to be in the rumen, since large doses of penicillin introduced into the abomasum had no ill-effect. The effect of oral chloral hydrate on rumen metabolism is similar to that of penicillin, thus the increased production of ruminal glucose, with subsequent duodenal absorption, simulates a continuous intravenous glucose infusion. This perhaps explains its therapeutic effect in acetonaemia.

N–Bromosuccinimide as an Effective Insecticide against Acarina. (Translated title). Wahby, A. H., Abdalla, A., and Barakat, M. Z. (1959). *Zbl. Vet.* **6.** 825.

In vitro action of this drug on the sarcoptic mite (from buffalo) was to cause paralysis of the suckers, loss of motility, shrinkage, and death, within 10 minutes. Death is probably not only due to surface action of the drug, but also to oxidation or breakdown of certain enzyme systems, as N–bromosuccinimide has already been reported as degrading a-amino-acids, and as an oxidising, brominating, and dehydrogenating agent. Rabbits recently infected with sarcoptic mange were completely cured using a 2 per cent. aqueous solution ; satisfactory results were also obtained with camels, buffaloes, horses, and calves. Five camels were cured in 3 to 5 days when dressed 3 times daily with the 2 per cent. suspension ; 10 horses took 5 to 8 days to cure ; 10 calves were dressed once every other day with 5 per cent. ointment and lesions healed in 3 to 7 days. The ointment is recommended for use on all farm animals so affected. The drug is non-irritant when applied as an aqueous suspension to the skin of the rabbit, or injected, or instilled into the eye. No toxicity was observed and the product is available commercially at a reasonable cost. (This work was done in Egypt).

A.D.W.

THE PRESIDENT'S RECEPTION

The President and Mrs. Hignett received a very large number of veterinary surgeons, their wives, friends and guests at the traditional Reception which is the last major social event at each year's Congress. A very happy evening was spent, the host and hostess adding yet further to the esteem in which the whole profession regards them.

Top left. Among the guests whom the President and Mrs. Hignett received were their two children, Rosemary and Timothy.

Bottom left. The President's wife with some of her overseas guests: left to right, Mr. G. A. Oduro from Ghana, Dr. L. V. Butcher from Trinidad, and Mr. and Mrs. S. B. Dhanapala from Ceylon.

Above. The retiring general secretary, Mr. F. Knight, wishes well to his successor, Mr. John A. Anderson, M.R.C.V.S.

Top right. In resigning the office of honorary treasurer Dr. Cotchin was able to tell the Annual General Meeting that the B.V.A. was living within its income. By way of proof he handed to his successor, Mr. Hebeler, an entire, negotiable £5 note.

Right. The President and Mrs. Hignett greet their successors, Mr. and Mrs. Jennings.

Below. The Glasgow research team whose work on the use of X-irradiated larvae as an immunising agent has brought so much distinction to their School: Doctors McIntyre, Urquhart, Jarrett and Mulligan.

News and Comment

ASSOCIATION OF VETERINARY FOOD HYGIENISTS

During the Annual Congress of the B.V.A. in Glasgow a meeting was called of those interested in veterinary food hygiene. Twelve members attended with Professor A. Robertson in the Chair and, after a discussion, unanimously approved of the formation of an Association of Veterinary Food Hygienists.

Mr. Horace Thornton, Newcastle, was then elected first Chairman of the new Association and the meeting continued under his guidance. After the election of Mr. G. S. Ferguson, Edinburgh, as Secretary a general discussion took place on the constitution and aims of the Association. It was considered that the Association should be a technical body primarily designed to facilitate and encourage the exchange of information and ideas between all members of the profession engaged in or interested in the veterinary aspects of food hygiene. Initially the Association would meet annually at the B.V.A. Annual Congress but it was hoped that it would ultimately prove possible to hold more frequent meetings, possibly on a regional basis.

To assist in the organisation and functioning of the new Association an Executive Committee consisting of the following members was proposed:—

Scotland, Mr. S. G. Abbott, Glasgow, and Mr. W. Grant, Stirling;

England, Mr. F. P. Lawton, Manchester, and Mr. E. F. McCleery, London;

Wales, Mr. J. H. M. Hughes, Cardiff;

N. Ireland, Mr. A. McLean, Belfast;

Eire, Mr. J. M. Murphy, Dublin.

Any member of the profession interested in the hygiene of foods of animal origin, whether engaged in full- or part-time meat inspection or not, is invited to join this new Association.

Further information can be obtained from the Secretary, G. S. Ferguson, B.SC., M.R.C.V.S., D.V.S.M., Department of Veterinary Hygiene, Royal (Dick) School of Veterinary Studies, Summerhall, Edinburgh, 9.

VETERINARY LABORATORY, LASSWADE

To celebrate the 21st anniversary of the opening of the Ministry of Agriculture Laboratory at Lasswade on August 18th, 1939, the staff was entertained to a cocktail party by Dr. J. E. Wilson who has been in charge of the laboratory since its inception. Amongst the guests were Major Rabagliati who assisted the Ministry of Works in the purchase of Eskgrove, Dr. Greenwood, Director of the Poultry Research Centre, Mr. J. Reid, R.V.O., and former members of the staff, including one of the two laboratory assistants who with the professional officer, a typist and a gardener composed the entire staff when the laboratory was opened; the staff now numbers 57. Dr. Wilson briefly reviewed the changes at Eskgrove from its opening as a small laboratory to undertake *post-mortem* examinations and agglutination testing for Scottish Accredited Breeders only, to the present when it not only undertakes poultry work of all kinds for Scotland and the Northern Counties of England and carries out research into poultry diseases, but also has a large-animal department investigating various disease problems and producing crystal violet vaccine for swine fever.

On behalf of the staff Mr. Duff, Senior Research Officer, thanked Dr. Wilson for his hospitality and made a presentation to him to commemorate the occasion.

APPOINTMENTS IN THE ANIMAL HEALTH DIVISION

The following changes have been made in the Veterinary Field Staff:—

Mr. A. F. Butler, Deputy Regional Veterinary Officer, Aberystwyth, retired from the Service on August 31st, 1960.

Mr. A. W. Stables, Veterinary Officer, who was stationed at Norwich, has resigned as from August 31st, 1960.

IMPORT OF CHAROLLAIS CATTLE

The National Cattle Breeders' Association, which remains, it is reported, opposed to trials in this country with Charollais beef bulls from France, has deputed a seven-man sub-committee to present its views to Mr. Soames, Minister of Agriculture.

The sub-committee will meet later this month.

Mr. Soames's decision is likely to be made early next month. The expectations are that it will be in favour of the trial.

Mr. G. B. Sweatman, on behalf of the Commercial Exhibitors Committee, presents the President's wife with a silver compact as a memento of the Congress.

The Officers of the Association for 1960-1 with their wives. Standing (left to right), Mr. Beynon, junior vice-President, Mr. Denholm, hon. secretary, Mr. Hignett, senior vice-President, Mr. Jennings, President, and Mr. Hebeler, hon. treasurer. Seated, Mrs. Beynon, Mrs. Hignett, Mrs. Jennings, and Mrs. Hebeler.

UNIVERSITY NEWS

London

A Course of two Special University Lectures in Veterinary Science will be given by Professor C. W. Emmens, D.SC., PH.D., Professor of Veterinary Physiology in the University of Sydney, at the Royal Veterinary College, Royal College Street, N.W.1, at 5 p.m. on Thursdays, October 13th and 20th, 1960. The first lecture will be entitled "The Biological Assay of Oestrogenic and Anti-oestrogenic Activity," and the second, "Effects of Anti-oestrogens." At the first lecture the chair will be taken by Professor E. C. Amoroso. The lectures are addressed to students of the University and to others interested in the subject; admission is free, without ticket.

FOWL PEST

Poultry keepers and auctioneers in England and Wales are reminded that the holding of auction sales of store poultry is prohibited during the months of October, November and December. During this period no licences can be issued for store poultry markets.

This ban was introduced in 1956 and is designed to reduce the risk of spreading fowl pest when the movements of live poultry are at a peak. During the fowl pest epidemic last winter, the ban was extended to cover the period January 1st to March 31st.

Sales of poultry or day-old chicks held on premises on to which no poultry or day-old chicks have been moved on the day of sale or during the previous 28 days, and which are not within a fowl pest Infected Area, do not require to be licensed and are not affected by the ban.

THE REGISTER OF VETERINARY SURGEONS

Registration in the Commonwealth List

HILL, Desmond Hayward, D.V.M. (TORONTO), Faculty of Agriculture & Veterinary Science, University College, Ibadan, Nigeria. September 5th, 1960.

HAIG, David Arthur, B.V.SC., D.V.SC. (PRETORIA), Veterinary Laboratory, Kabete, Kenya. September 7th, 1960.

PERSONAL

Dr. F. R. Bell left this country yesterday for Los Angeles where he will take up a one-year Wellcome Travelling Research Fellowship in the University of California.

Mr. V. G. M. Marijnen, who has been the Minister of Agriculture and Fisheries in the Netherlands Government since May, 1959, has been visiting the U.K. from the evening of September 13th to the morning of the 17th as a guest of Her Majesty's Government.

Marriages

BETTERIDGE—ETHERINGTON.—On Saturday, September 10th, 1960, at St. Christopher's Church, Burlington, Ontario, Canada, Keith James Betteridge, B.V.SC., M.R.C.V.S., of Dibden, Hampshire, to Lois Margaret Etherington, of Burlington, Ontario.

EDWARDS—BINGHAM.—At St. Bartholomew the Great, Smithfield, London, on August 12th, by the Rev. Dr. N. E. Walbank, Dr. J. Griffith Edwards to Miss Dorothea Mary Ann Bingham. Older members of the profession will be interested to learn that the bridegroom is a great grandson of Professor and Mrs. Thomas St. John Walley, and grandson of Sir John and Lady M'Fadyean.

R.C.V.S. OBITUARY

We record with regret the death of the following members of the profession:—

FERGUSON, Alistair, Strathavon, Girvan, Ayrshire. Graduated July 10th, 1939, at the Glasgow Veterinary College. Died September 6th, 1960, aged 47 years.

Supplementary Veterinary Register

COOPER, Robert Jonathan, of Redberry, Abberton, Colchester, Essex. Admitted to the Register November 28th, 1949. Died August 27th, 1960, aged 66 years.

COMING EVENTS

September

18th (Sun.). Annual General Meeting of the Veterinary Section of UFAW, which will be addressed by Mr. Sydney Jennings, at Culham College, Abingdon, Berks., 2 p.m.

21st (Wed.). Joint Meeting of the North Wales Division with local Branches of the British Medical Association for a Symposium on Brucellosis at the Imperial Hotel, Llandudno, 2 p.m.

General Meeting of the Society of Practising Veterinary Surgeons at the Victoria and Station Hotel, Preston, Lancs., 8 p.m.

22nd (Thurs.). Meeting of the East Midlands Division at Boots Veterinary Research Station, The Priory, Thurgarton, Notts., 12.45 p.m.

Autumn Meeting of the North of Scotland Division in the Drumossie Hotel, Inverness, 2.30 p.m.

23rd (Fri.). First Meeting of the B.S.A.V.A. branch at the Golden Lion Hotel, Stirling, 6.30 p.m.

26th (Mon.). Meeting of the Yorkshire Division at the Talbot Hotel, Malton, 8 p.m.

28th (Wed.). Meeting of the B.S.A.V.A. North East Region at the Queen's Hotel, Leeds, 1, 8 p.m.

Meeting of the Southern Counties Veterinary Society at the Red Lion Hotel, Salisbury, 7.30 p.m.

Meeting of the South-East Midlands Veterinary Association at Franklins Gardens Hotel, Northampton, 7.30 p.m.

29th (Thurs.). Open Day at the School of Veterinary Medicine, Madingley Road, Cambridge, 2 to 5 p.m.

30th (Fri.). General Meeting of the North of England Veterinary Medical Association at Nether House, Alnwick, 2.30 p.m.

October

5th (Wed.). Meeting of the R.A.V.C. Division at the Equine Research Station, Balaton Lodge, Newmarket, 11 a.m.

Autumn Meeting of the Scottish Metropolitan Division in the Royal (Dick) School of Veterinary Studies, Edinburgh, 2.45 p.m.

6th (Thurs.). Meeting of the Technical Development Committee of the B.V.A. at 7, Mansfield Street, Portland Place, London, W.1, 10.30 a.m.

General Meeting and Dinner of the Lancashire Veterinary Association at the Exchange Hotel, Liverpool, 6 p.m.

15th (Sat.). Meeting of the B.S.A.V.A. North West Region at the Bull and Royal Hotel, Preston, 8 p.m.

18th (Tues.). Dinner-Dance of the Mid-West Veterinary Association at the Berkeley Café, Clifton, Bristol.

27th (Thurs.). Meeting of the Society for the Study of Animal Breeding at the Society's House, 1, Wimpole Street, London, W.1, 11.30 a.m.

December

2nd (Fri.). Annual Dinner Dance of the North of England Veterinary Medical Association in aid of the V.V.B.F. at the White Swan Hotel, Alnwick.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Atrophic Rhinitis

Cambs. Mill Farm, March Road, Welney, Wisbech (Sept. 8).

Foot-and-Mouth Disease

Lincs. Main Road, Huttoft, Alford (Sept. 10).

Fowl Pest

Essex. Sandon Poultry Services, Butts Green, Chelmsford (Sept. 8); Chamberlains Farm, Shoreham Lane, Danbury, Chelmsford; Maldon Wick, Maldon (Sept. 11).
Lincs. High Street, Navenby, Lincoln (Sept. 7).
Warwicks. 393, Victoria Road, Aston, Birmingham (Sept. 9).
Worcs. The Caravan, Hewall Corner, Bromsgrove (Sept. 9).
Yorks. 8, New Lane, Drighlington, Bradford (Sept. 7).

Swine Fever

Ches. Broxton Post Office, Broxton, Malpas (Sept. 6); Old Moss Farm, Stapleford, Tarvin (Sept. 7).
Hants. Lower Shootash Farm, East Wellow, Romsey (Sept. 9).
Lancs. 69, Red Cat Lane, Burscough, Ormskirk (Sept. 6); Bates Green Farm, Dicketts Bridge, Lathom, Ormskirk (Sept. 7); Lower Kilshaw Farm, Carleton, Poulton-le-Fylde, Blackpool (Sept. 9).

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Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

SCIENTIFIC

Serology of *Pasteurella haemolytica*

Sir,—In view of increasing interest in *Pasteurella haemolytica* I would like to draw attention to several points relating to recent work.

In a recent report on the serology of *P. haemolytica* (Carter, 1956) I neglected to mention the names of those persons contributing the imported strains. This omission may have been responsible for an apparent unawareness of a wide distribution of the serological type of *P. haemolytica* identified in that study.

The strains from septicaemia of lambs in Scotland were contributed by Dr. J. T. Stamp of the Moredun Institute. Those strains from mastitis of ewes in Montana were contributed by Dr. L. Ds. Smith of the Montana Veterinary Laboratory, U.S.A. The Belgian strains from bovine pneumonia came from the laboratory of Dr. A. Florent.

A recent report by Biberstein *et al.* (1960) has established the existence of a number of serological groups of *P. haemolytica* on the basis of differences in capsular antigens. They employed an indirect haemagglutination test similar to the one first employed by me for the identification of serological types of *Pasteurella multocida*. As far as I know this was the first use of the indirect haemagglutination test for the recognition of serological types of bacteria.

I believe credit should be given my serological study of *P. haemolytica* (Carter, 1956) for the identification of what Biberstein *et al.* refer to as their type 1. It would appear that this type is, from the standpoint of disease, the most important serological variey of *P. haemolytica*.

Yours faithfully,
G. R. CARTER.

Department of Pathology and Bacteriology,
Ontario Veterinary College,
Guelph,
Canada.
August 25th, 1960.

References

BIBERSTEIN, E. L., GILLS, M., & KNIGHT, H. (1960). *Cornell Vet.* **50.** 283.
CARTER, G. R. (1955). *Am. J. Vet. Res.* **16.** 481.
———. (1956). *Can. J. Microbiol.* **2.** 483.

GENERAL

Treatment of Fascioliasis

Sir,—It was during late summer of 1959 and the winter of 1959-60 that we had an outbreak of fascioliasis in cattle in this area. As the time is right for further trouble my experience in the use of an injection of carbon tetrachloride may interest your readers. It was found that even though the correct procedure in the use of hexachlorethane was stressed to the owners, and I believe the advice taken, it had drastic effects on many cattle. In this area its use has been followed by anorexia, scouring, rapid loss of condition, and even death of the cow. These effects are such that I did not dare to use it on a herd of badly affected or heavily pregnant animals. So, I turned to the injection of carbon tetrachloride, with excellent results. Initially only heifers were injected. Some of them were badly affected being thin, anaemic and scouring. Faeces samples were sent to the Veterinary Investigation Centre, Liverpool, and fascioliasis was confirmed. A mixture of equal parts of liquid paraffin and carbon tetrachloride was used. On July 10th, 1959, 18 pedigree Friesian heifers weighing approximately 6 cwt. were each given 12 c.c. intramuscularly in the rump. They were examined 2 days later and showed no local reaction at the site of injection. Five days later they were improving, appetite returning, scouring lessening or ceased, and they seemed stronger. On July 16th, 1959, a second group of 30 pedigree Friesian heifers weighing approximately 7 cwt. were given 15 c.c. of the mixture. Again, there was no local or systemic reaction and they improved in condition.

Reassured by this experience, and having obtained a commercially available sterile mixture of carbon tetrachloride with Diloma compound D and a local anaesthetic*, I have since treated pregnant cows with no deleterious effect and indeed with excellent results. A herd of Aberdeen Angus cows was badly affected and had been treated 6 weeks earlier with hexachlorethane. They were still thin and scouring and some were anaemic. That the faeces contained fluke eggs was confirmed by the Veterinary Investigation Officer, Liverpool. Five cows were due to calve in a week or so and 25 were 7 to 8 weeks pregnant. On March 25th, 1960, the group of 25 cows was given 18 c.c. intramuscularly and on April 5th the five cows, which had calved by this time, were each given 18 c.c. of the preparation. In due course all the cows calved without incident.

I am aware that, the number of cattle treated is not great and that the doses given were lower than those now recommended. I believe, however, that in Wales especially, there are veterinary surgeons with more experience in the use of carbon tetrachloride by injection and it would be interesting to learn their views on this method of treatment.

Yours faithfully,
WILLIAM J. JORDAN.

Green Paddocks,
Pulford,
Near Chester.
September 2nd, 1960.

* Carboloma—Evans Medical Ltd., Liverpool.

Iron Content of Drinking Water

Sir,—I read with great interest the remarks about the iron content of drinking water which occur in Dr. Tj. Bakker's paper on "Veal Production" (THE VETERINARY RECORD, **72.** 702).

While it is true that most British town water supplies, especially in the Home Counties, are relatively free from iron, in the Midlands there are local springs and boreholes which frequently contain amounts comparable with the figures given for Dutch waters. I have known the iron content to be as high as 8 p.p.m., but it is extremely variable, even from the same source, and appears to be affected by the local rainfall. When the iron content is high it tends to precipitate out on standing, forming a reddish yellow deposit known locally as "ochre." On some farms in Derbyshire the field drains become choked with this substance, which forms a paste resembling tomato soup.

During last year's drought iron was also present in some Midland town supplies up to 0.35 p.p.m., but this is, I believe, unusual. On some farms I have associated hormonal derangement in cattle with a rise in the iron content of their drinking water to a level of 0.4 p.p.m. or more. Other factors are undoubtedly involved, however, and the effect of such iron levels is harmless, or may even be beneficial, on some farms, although apparently toxic on others. Much more work needs to be done to elucidate the exact rôle of soluble iron for cattle, but I welcome this evidence from our Dutch colleagues that the levels mentioned can have an effect on metabolism, as I understand that some workers in this country have doubted that this is possible.

Yours faithfully,
CONNIE M. FORD.

Ministry of Agriculture, Fisheries and Food,
Veterinary Investigation Centre,
School of Agriculture,
Sutton Bonington,
Loughborough, Leicestershire.
September 12th, 1960.

Hospitality at Congress

Sir,—May I take the liberty of utilising your columns to express my appreciation of the hospitality extended to myself and officers of other Local Authorities, by Mr. Abbott and his colleagues during our short stay in Glasgow at the recent Congress?

We were entertained to a most interesting and instructive morning at the Glasgow City Abattoir and left with an impression of genuine goodwill existing between all members of the staff.

Let us hope that Mr. Abbott's expressed desire for greater co-operation between those members of the profession engaged in meat inspection is a good augury for a better future for this branch.

Inspectors Office, F. P. LAWTON.
Manchester City Abattoir,
1, Elm Street,
Manchester, 3.
September 7th, 1960.

Destruction of Race-horses on the Course

Sir,—Hamilton Kirk's querulous comment on Mr. Garrett's eminently sound action in the "Angers" tragedy reminds me of an old saying we have concerning our Gaelic games that "the best hurler is always on the ditch."

I would agree with Mr. Bell that a "get together" of those of us engaged on race-courses or point-to-points to discuss this hazardous work could be most helpful.

Yours faithfully,
C. J. CORCORAN.

Dominick Street,
Mullingar,
Co. Westmeath,
Eire.
August 31st, 1960.

Sir,—In all probability the publicity given in the lay press to the case of "Angers" would not have been so prolonged if certain of our members, who apparently never saw the horse, had refrained from making worthless comments.

The X-ray photograph has fully vindicated the decision taken by those who examined the animal and proves, once again, that these were the sole persons able to give an opinion.

Every endeavour must be made to ensure that those in attendance are provided with up-to-date facilities to deal with casualties and, in their absence, members of the profession should decline to function. It is not uncommon to find no transport provided to remove either the injured, or the dead.

Yours faithfully,
J. F. D. TUTT.

"Rothiemurchus,"
St. Cross,
Winchester.
September 3rd, 1960.

Obstetrics

Sir,—Mr. Straiton should remember that he can be run out off a "no-ball."

Yours faithfully,
E. F. LEWIS.

2, Byng Drive,
Potters Bar,
Middlesex.
August 28th, 1960.

"Disease" of Turkey Poults

Sir,—Mr. Barton-Mann will be interested to know that in some of the outbreaks of "X" disease in turkeys, these were definitely not associated with rations containing milo.

Yours faithfully,
W. P. BLOUNT.

The British Oil & Cake Mills, Ltd.,
Poultry Advisory Service,
2, Kingscote Street,
London, E.C.4.
September 2nd, 1960.

Sir,—We have read with interest the letters in recent issues of THE VETERINARY RECORD concerning a new turkey disease.

These letters did not mention the similarity of the lesions to those noted when toxic fat was fed to chickens in the United States during 1957. The descriptions of the *post-mortem* lesions noted in these turkey poults are almost identical to those described by Sanger (1957) in his article on "Alimentary Toxaemia in Chickens."

In the case of the toxic fat, turkeys fed experi-

mentally did not develop pronounced signs and symptoms according to Edgar (1957). We are not aware of the toxic fat causing trouble on commercial turkey farms in the United States in 1957.

We believe that some toxic factor will be identified by the research workers as the cause of this new turkey disorder.

Yours faithfully,

JAMES R. WILEY,
Director of Development and Technical Services.
Whitmoyer Laboratories Inc.,
Myerstown,
Pennsylvania, U.S.A.
September 9th, 1960.

References

EDGAR, S. A. (1957). *Poult. Sci.* **37**. 1,200.
SANGER, V. L. (1957). *J. Amer. vet. med. Ass.* **133**. 172.

Histamine Associated with Other Conditions : Treatment by Saline Intravenously

Sir,—" In 1910 Dale and Laidlaw implicated histamine in the aetiology of anaphylaxis and allergy. Recent work and clinical trials have substantiated this theory regarding anaphylaxis and circumstantial evidence based mainly on the successful use of antihistamine suggest the involvement of histamine in allergic conditions.

" Histamine is widely distributed in an inactive form in lungs, liver and to a lesser extent in blood and muscle tissues. As a result of trauma, injury or infection it is liberated by the skin, lungs and other tissues. . . . " (Veterinary Diary, 1959, M. & B.)

It is now over 40 years since the therapeutic value of saline in many and often obscure conditions was " discovered " by the writer, and experience in the years that have passed has deepened his conviction of its efficacy. Many years ago a practitioner in the north west of England wrote on the same subject but was largely ignored as salt treatment was too cheap, and could not possibly be credited with the results claimed—or so it was thought. The late E. Wallis Hoare gave this information and included the name of the veterinary surgeon which has escaped the memory of the writer. Repeated and annoying failure to arrive at a satisfying diagnosis and to explain the gratifying results often obtained has long been the lot of the writer. Histamine, widely distributed as it is, now appears to complicate far more conditions than was for long imagined, and to be associated with pain which can be considerably relieved by the antihistaminic action of salt.

The idea of common salt and sodium citrate in combination intravenously arose from a paper by the late A. W. Noel Pillars on the " *Strongylus vulgaris* Possibly Complicating Colic in Cart Horses." The question of the destruction of the parasite in the ileo-caecal-colic artery was considered inadvisable as in the first thrombus examined by the writer a calcified parasite was found protruding from the wall of the artery. Better still to allow the parasites to make their own way out of the artery and to be content with a dissolution of the thrombus. Experimentally, immersion of a *post-mortem* specimen in saturated salt solution proved successful in itself but to ensure and enhance success sodium citrate was added.

Two aged and thin horses due for destruction were given intravenous treatment 3 times at 10-day intervals. There appetites were fickle at first but soon became voracious and their condition rapidly improved. *Post-mortem* examination revealed enlarged and thickened arteries, healing of recent lesions in the intima, but no thrombi, though parasites were still present.

The beneficial results of the intravenous injection of salt 1 ounce; sodium citrate 4 drachms, in one pint of water in thin and debilitated horses are incredible; the writer has never seen such results in over 60 years of practice. The transition from debility to excellent health is spectacular and rapid, 2 to 3 weeks after one injection in the majority of cases. No explanation is offered as correct diagnosis is difficult and the action of the treatment is not understood.

Since the introduction of the intravenous treatment by the writer it has been adopted in a large and varied number of cases and with success.

1. *Shoulder lameness.* The decalcifying and absorbent action has resulted in 20 out of 22 cases making a complete recovery, the failures appeared to be due to excessive bone enlargement. Rest was advised in addition to treatment at several days' interval.

2. *Thoroughbred.* Low condition at grass, old winter coat unshed, made a good recovery after one injection.

(3) *Thoroughbred.* Had proved a difficult horse to ride and so was neglected. Low condition but improved quickly and quickly became amenable, won over £1,000 in stakes last season as a hurdler. Owner has great hopes of him as a steeplechaser.

(4) *Thoroughbred.* Sold as a yearling for £4,000. Low condition with fetid odour from his mouth, and quickly faded in his gallops. Made an excellent recovery and is now a consistent winner over hurdles.

(5) *Cart horse.* Acute laminitis. Intravenous treatment repeated in two days was followed by complete recovery—no laminitic action or structural changes as sequelae.

(6) *Impaction of the Ileum.* Several cases. Intravenous treatment with insertion and retention of the tube in the stomach to allow vomition. The condition is probably analogous to miners' cramp. The writer is not alone in this view.

Yours faithfully,

W. W. LANG.
Albert Street,
Brigg,
Lincs.
August 13th, 1960.

Rinderpest in Impala

Sir,—The significance of wild game in the epizootiology of rinderpest is controversial. Some maintain that their rôle is negligible while others assert that, at least in East Africa, game are the most significant disseminators of the disease.

Probably all members of the Order Artiodactyla are susceptible to rinderpest. Nevertheless the only

species regularly incriminated in outbreaks are buffalo, eland and wild pig. The disease has allegedly been observed sporadically in many other species. Confirmations by isolation and identification of the pathogens restrict the list, however, to about 15 species.

Records on impala (*Aepyceros melampus* Lichtenstein) are meagre and contradictory. Many game wardens and hunters in East Africa believe that impala are infected naturally. Theiler (1897), however, stated that they were not attacked during the panzootic which swept through Africa in the '90s. Poulton (1927) considered that their susceptibility was variable. Brown and Scott (to be published) inoculated 6 impala with attenuated lapinised rinderpest vaccine and all 6 exhibited clinical reactions.

Recently rinderpest flared up in the Northern Frontier Province of Kenya. Deaths amongst buffalo, eland, giraffe, bushbuck, wild pig and impala were reported. The Ngorien area was visited and a sick impala was selected and shot. The *post-mortem* findings suggested an early stage in the infection, the most prominent feature being a mild enteritis. Lymph node samples were collected, emulsified and diffused through agar against rinderpest-hyperimmune rabbit serum. Precipitation lines did not develop. Specific rinderpest complement-fixing antigen, however, was demonstrated in aliquots of the same lymph node samples. Biological tests to detect the infectious agent were prohibited by the concurrent existence of foot-and-mouth disease in the area.

The apparent contradictory results in the *in vitro* tests in fact correlated with the *post-mortem* findings. The agar gel test is far less sensitive than the complement-fixation test and in the early stages of the disease the latter is detectable while the former is not (Cowan & Scott, to be published). The diagnosis of rinderpest was therefore considered to be confirmed.

Yours faithfully,
G. R. SCOTT,
K. M. COWAN.

East African Veterinary Research Organisation,
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R. T. ELLIOTT.

Game Department,
Maralal, Kenya.
September 1st, 1960.

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A Temporary Infertility Syndrome

Sir,—For many years "wait for the spring" has been the farmer's answer to anoestrus in a bunch of heifers. The usual syndrome of recovery from anoestrus associated with anoestrous ovaries is anoestrus with cystic ovaries possibly suboestrus is then true oestrus, possibly one or two normal periods, and finally pregnancy. It has also long been recognised that some cows show overt oestrus within 3 weeks of parturition, whilst others may first have a period of anoestrus the length of which may vary from a few weeks to several months. Here, too, the same syndrome of recovery is found. On a large farm there are sufficient numbers present in this post-parturient phase at the same time throughout most of the year for it to become apparent that this is not so much an individual cow variation as a herd variation, affecting only the animals at this stage of the reproductive cycle (*i.e.* that at times the "available herd" exhibits overt oestrus with little or no delay after parturition, whilst at others there is some delay).

Among the fresh calvers I associate periods of high herd fertility with little or no delay of first overt oestrus; periods of low herd fertility I associate with delayed first overt oestrus and its concomitant signs of the anoestrous, cystic or suboestrous ovary. Those cows farther on in lactation but not yet in calf may return regularly; however, they may often develop suboestrous or anoestrous ovaries, due generally to cystic ovaries, but occasionally to anoestrous ones. This temporary infertility syndrome is nowadays a common problem encountered in routine veterinary practice in the late winter and early spring. In milder forms, only the older cows approaching the peak of lactation are affected.

Over the last 4 years in one large bail herd which has frequent solids-not-fat checks I have observed a close association between temporary large herd S.N.F. depressions and this characteristic infertility syndrome. In a mainly autumn-calving herd such sudden variations of herd S.N.F. values, especially at the end of the winter, are most likely to be a reflection of the nutritional status of the herd. Even the addition of a few freshly calved animals has little effect on a large herd yielding 400 to 500 gallons a day.

In 4 other herds with temporary S.N.F. problems this same syndrome has been observed—but less well because of the relatively infrequent monthly checks. The termination of the syndrome is associated with a rise of S.N.F. per cent. (generally the spring rise) of the order of 0.25 to 0.40 per cent. In 2 herds which did not experience this syndrome the rise was of the order of 0.15 to 0.20 per cent., which is the width of the upper range of S.N.F. values associated with high fertility in this one large herd.

If the twin reputations spring has for fertility and solids-not-fat are more than coincidence it must be because herd S.N.F. at this time of year is a crude measure of the nutritional status of the herd. A fall is often exaggerated in a high yielding bail herd where there is always a strong temptation to underfeed high yielding fresh calvers and overfeed low yielding stale calvers. The writer therefore considers it advisable to publish these early results in the hope that more evidence may be collected this coming winter.

Yours faithfully,
C. M. GOULD.

"Rockholme,"
12, Landguard Road,
Southampton.
September 7th, 1960.